Digiac-3080 Information

This information, mostly from https://digiac3080.wordpress.com/ was used to build the emulator.

Characteristics of the Digiac 3080

- 25-bit words (Sign + 24-bit Magnitude)
- 1 Register/Accumulator (A) and Extended Register (B) for Multiply and Divide
- Logical Address Space – 0000 to 7777_8 (12 bits) – 4096_{10} words
- Speed: A blazing **60 Instructions per second**!

Instruction Format

24-bit word broken up as follows

```
Opcode   | xxx xxx | ... ... | ... ... ... ... |
Count    | ... ... | xxx xxx | ... ... ... ... |
Address  | ... ... | ... ... | xxx xxx xxx xxx |
```

Count

Arithmetic Instruction: *Bit Shift count* Numbers can be shifted when they move between the accumulator and memory:

00_8	No Shift	01_8-27_8	Shift Left 1 - 23 places
30_8-50_8	Shift 24 or more bits: result is 0	51_8-77_8	Shift Right 23 - 1 places

I/O Instruction: *Word count – Two's complement of count*

Number of words = (100_8 - instruction_count_field)

Instruction Set

Opcode	Mnemonic	Description		Opcode	Mnemonic	Description
00	HLT	Halt		44	JMP	Jump
04	AND	Bitwise AND		45	BR-	Branch on Minus
10	CLA	Clear and Add	**Opcode Modifiers**	46	BR+	Branch on Plus
11	CLS	Clear and Subtract	X1: Toggle Sign	47	BRZ	Branch on Zero
14	ADD	Add	X2: Force +	50	TO	Type Octal
15	SUB	Subtract	X3: Force -	54	TA	Type Alpha
20	MLT	Multiply		60	RT	Read Tape
24	DIV	Divide		62	RC	Read Card
30	STA	Store A		63	TI	Type In Alpha
34	STB	Store B		64	PT	Punch Tape

Character Set – It's *not* ASCII, it's DIGIAC!

Character	Value	Character	Value
0	00	TAB	40 Note 2
1	01	N	41
2	02	O	42
3	03	P	43
4	04	Q	44
5	05	R	45
6	06	S	46
7	07	T	47
8	10	U	50
9	11	V	51
–	12	W	52
;	13	X	53
/	14	Y	54
!	15	Z	55
‘	16	.	56
=	17	INDEX	57 Note 2
BLANK	20 Note 1	)	60
SPACE	20	+/-	61
A	21	@	62
B	22	#	63
C	23	$	64
D	24	%	65
E	25	CENT	66 Note 3
F	26	BLANK	66 Note 2
G	27	&	67
H	30	*	70
I	31	(	71
J	32	_	72
K	33	:	73
L	34	?	74
M	35	DEGREE	75
,	36	“	76
CR	37 Note 2	+	77

- Note 1: Card Input Only
- Note 2: (TA) Output Only and Tape Only
- Note 3: (TI) Input Only